

AIR FORCE QUALIFICATION TRAINING PACKAGE (AFQTP)



for
STRUCTURAL
(3E3X1)

MODULE 31
OXYACETYLENE WELDING

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Career Field Education and Training Plan (CFETP) references from 1 Apr 97 version.

OPR: HQ AFCESA/CEOT
(SMSgt Michael R. Shakal)

Certified by: HQ AFCESA/CEO
(Colonel Lance C. Brendel)

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INTRODUCTION

Before starting this AFQTP, refer to and read the “Trainee/Trainer Guide” located on the AFCESA Web site <http://www.afcesa.af.mil/>

AFQTPs are mandatory and must be completed to fulfill task knowledge requirements on core and diamond tasks for upgrade training. *It is important for the trainer and trainee to understand* that an AFQTP ***does not*** replace hands-on training, nor will completion of an AFQTP meet the requirement for core task certification. AFQTPs will be used in conjunction with applicable technical references and hands-on training.

AFQTPs and Certification and Testing (CerTest) must be used as minimum upgrade requirements for Diamond tasks.

MANDATORY minimum upgrade requirements:

Core task:

AFQTP completion
Hands-on certification

Diamond task:

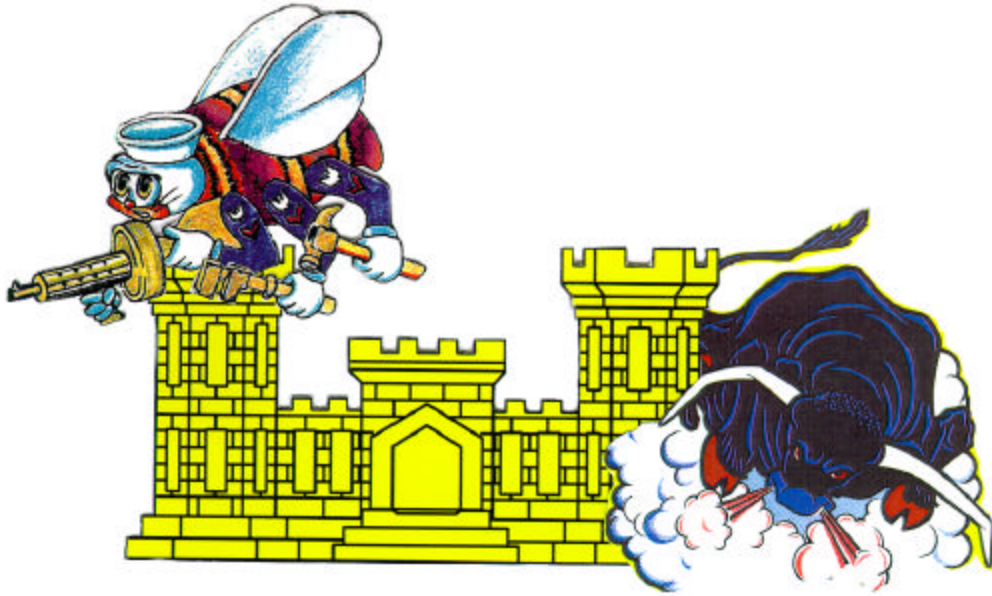
AFQTP completion
CerTest completion (80% minimum to pass)

Note: *Trainees will receive hands-on certification training for Diamond Tasks when equipment becomes available either at home station or at a TDY location.*

Put this package to use. Subject matter experts under the direction and guidance of HQ AFCESA/CEOT revised this AFQTP. If you have any recommendations for improving this document, please contact the Structures Career Field Manager at the address below.

HQ AFCESA/CEOT
139 Barnes Dr. Suite 1
Tyndall AFB, FL 32403-5319
DSN: 523-6421, Comm: (850) 283-6421
Fax: DSN 523-6488
E-mail: ceott.helpdesk@afcesa.af.mil

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OXYACETYLENE WELDING

MODULE 31

AFQTP UNIT 4

ASSEMBLE AND TEST OXYACETYLENE EQUIPMENT FOR GAS LEAKS (31.4.)

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ASSEMBLE AND TEST OXYACETYLENE EQUIPMENT FOR GAS LEAKS

Task Training Guide

STS Reference Number/Title:	31.4. Assemble and test oxyacetylene equipment for gas leaks
Training References:	<ul style="list-style-type: none"> • 3E351 CDCs • WELDING SKILLS by R.T. Miller • Williams Learning Network CD-ROM Interactive Maintenance Training Program, <i>Oxy-Fuel Gas Welding</i>.
Prerequisites:	<ul style="list-style-type: none"> • Possess as a minimum, a 3E331 AFSC
Equipment/Tools Required:	<ul style="list-style-type: none"> • Torch wrench, Soapy water, Bucket of clear water
Learning Objective:	<ul style="list-style-type: none"> • Individual should be able to test oxyacetylene equipment for leaks.
Samples of Behavior:	<ul style="list-style-type: none"> • Trainee should know the safe way to test oxyacetylene equipment for gas leaks.
Notes:	
* Trainee is encouraged to use Williams Learning Network CD-ROM program. See your Unit Training Manager for this program and any CERTTEST videos related to this subject.	

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ASSEMBLE AND TEST OXYACETYLENE EQUIPMENT FOR GAS LEAKS

Background: All welding equipment needs to be checked for leaks each time it is used. A leaky apparatus is very dangerous since a fire may develop, and a leak means wasted gas.

To perform the task, follow these steps:

Step 1: Fasten the cylinders to a fixed object so that they cannot move. Remove the protective cap and make sure that the valves are not damaged.

Step 2: While standing to one side of the cylinder, crack the valve and ensure there is no dirt in the valve.

HINT:

Open the valve quickly to avoid wasting gas.

Step 3: Connect the regulators to the correct bottle with a torch wrench.

NOTE:

Remember that acetylene bottles have left handed threads and oxygen bottles have right-handed threads.

Step 4: Connect the hoses to the regulators, making sure the correct hoses are going to the correct regulators.

Step 5: Attach the torch body to the hoses and appropriate tip you need to use. Then test for leaks.

Testing for leaks. To test for leaks, open the oxygen and acetylene valves with the needle valve on the torch closed. Adjust the valves to normal working pressure, and apply soapy water to all the connections. Inspect each joint carefully; if a leak is detected by a connection use a wrench to tighten the fitting. If the leak does not stop, shut off the gas and examine the threads of the valve. To check for leakage in the welding hoses, turn on the regulators to working pressure and submerge the hoses in clean water, looking for any bubbles. If there are any leaks in the hoses, replace the hoses to prevent possible safety hazards.

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**Review Questions
for
Assemble and Test Oxyacetylene Equipment for Gas Leaks**

Question	Answer
1. Welding equipment only needs to be checked for leaks once a month.	a. True b. False
2. Acetylene hoses have right-handed threads.	a. True b. False
3. Stand to one side of the cylinder when cracking the valve.	a. True b. False
4. To test for leaks, open the _____ and acetylene valves with the needle valve on the torch closed.	a. oxygen b. oxide c. tank d. needle
5. Acetylene bottles have _____ handed threads and oxygen bottles have _____ handed threads.	a. left, right b. left, left c. right, left d. right, right

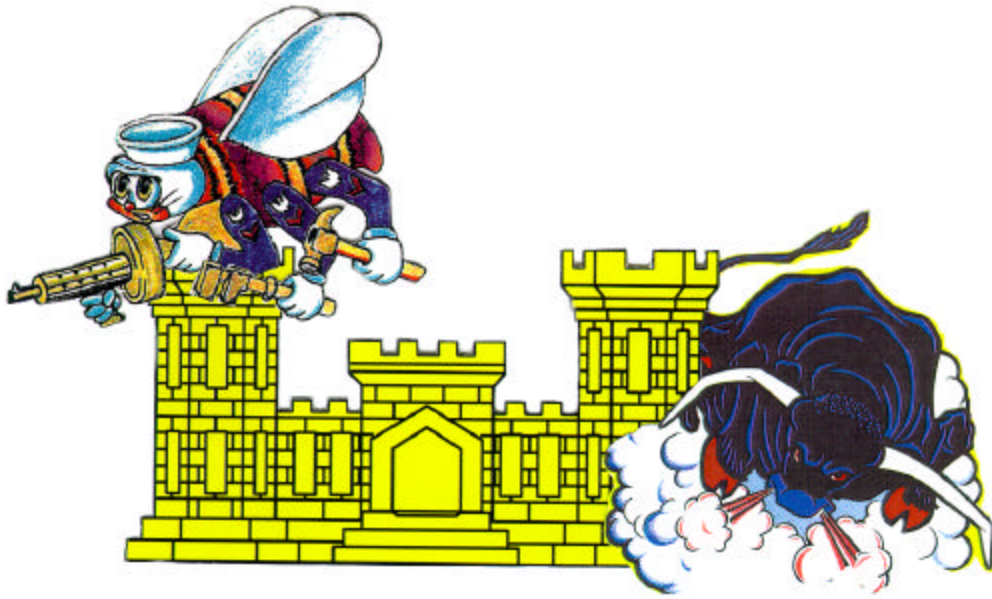
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ASSEMBLE AND TEST OXYACETYLENE EQUIPMENT FOR GAS LEAKS

Performance Checklist		
Step	Yes	No
1. Did the trainee fasten the cylinders to a fixed object?		
2. Did the trainee use a wrench to tighten all the joints?		
3. Did the trainee connect the correct hoses to the correct regulators?		
4. Were all joints tested for leaks before the equipment was used?		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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OXYACETYLENE WELDING

MODULE 31

AFQTP UNIT 10

USE OXYACETYLENE EQUIPMENT TO CUT METAL (31.10.)

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USE OXYACETYLENE EQUIPMENT TO CUT METAL***Task Training Guide***

STS Reference Number/Title:	31.10. Use oxyacetylene equipment to cut metal
Training References:	<ul style="list-style-type: none"> • 3E3X1 CDCs • WELDING SKILLS by R.T. Miller • Williams Learning Network CD-ROM Interactive Maintenance Training Program, <i>Oxy-Fuel Gas Welding</i>
Prerequisites:	<ul style="list-style-type: none"> • Possess as a minimum, a 3E331 AFSC
Equipment/Tools Required:	<ul style="list-style-type: none"> • Gloves, Cutting Goggles, Striker, Welding Jacket
Learning Objective:	<ul style="list-style-type: none"> • Individual should be able to describe the procedures for cutting metal
Samples of Behavior:	<ul style="list-style-type: none"> • Trainee will be able to cut metal safety
Notes:	
* Trainee is encouraged to use the Williams Learning Network CD-ROM program. See your Unit Training Manager for this program as well as any CERTTEST videos related to this area.	

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USE OXYACETYLENE EQUIPMENT TO CUT METAL

Background: Oxyacetylene cutting is a fast and economical way to cut steel. A cutting torch lets you make accurate cuts and prepare joint edges on the job without having to rely on time-consuming methods such as sawing or grinding. The cutting torch mixes oxygen and acetylene in definite proportions; burns the mixture in a preheating flame, which heats the work. The hand-cutting torch is similar to the welding torch, but is different in construction and method of control.

SAFETY:

ALL SAFETY EQUIPMENT MUST BE WORN WHEN CUTTING OR WELDING

When preparing to cut metal, you must select the right tip size and adjust the regulators to the correct pressure for the job. Table 1 below shows various tip sizes and pressures required for different thicknesses of metal plate.

Table 1, Recommended Pressures for Various Plate Thicknesses

PLATE THICKNESS	TIP SIZE	ACETYLENE PRESSURE	OXYGEN PRESSURE
1/4 in	0	3	25 to 30
3/8 to 1/2 in	1	3	30 to 40
3/4 to 1 in	2	3	40 to 50
1 1/2 in	3	3	45 to 50
2 in	4	3	50 to 55
3 to 4 in	5	4	55 to 60
5 to 6 in	6	5	55 to 65
8 to 10 in	7	6	60 to 70
12 in	8	6	70 to 80

Turn the acetylene needle valve open 1/4 turn, light the torch with a striker, and adjust the oxygen valve to get a neutral flame. Hold the torch perpendicular to the work surface with the inner cones of the preheating flame slightly above the surface. When the correct heat has been reached, push the oxygen handle on the torch slowly at first, then fully open. If the cut is made properly with the correct pressure and cutting speed, a shower of sparks falling from the opposite side will indicate the cut has penetrated through the metal. Keep the torch between 1/8 to 1/4 inches above the metal at all times while cutting. If you've made the cut correctly it will be clean and narrow and will compare to the cut of a saw.

NOTE:

Be sure to use the correct pressure when oxyacetylene cutting.

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**Review Questions
for
Use Oxyacetylene Equipment to Cut Metal**

Question	Answer
1. How close should the flame be from the metal when cutting?	a. 1 inch. b. Inner cone slightly above the metal. c. Inner cone 3/4 inches away from the metal. d. Torch head touching the metal.
2. What is the correct tip size to use to cut 3 inch metal?	a. 8 b. 3 c. 5 d. 4
3. A shower of sparks falling from the opposite side of the metal will indicate that _____.	a. the metal is binding. b. you're cutting speed is not fast enough. c. the cut has penetrated through the metal d. you are using the wrong striker.
4. The hand-cutting torch is similar to the welding torch, but is different in construction and method of control.	a. True b. False
5. The cutting torch mixes oxygen and acetylene in definite proportions; burns the mixture in a preheating flame, which heats the work.	a. True b. False
6. According to Table 1, if the plate thickness is 3 to 4 inches thick, use a size ____ tip, acetylene pressure of ____ and oxygen pressure of ____.	a. 5, 4, 55 to 60 b. 4, 5, 55 to 60 c. 5, 4, 50 to 55 d. 5, 4, 50 to 60
7. To get a neutral flame, turn the acetylene needle valve open 1/4 turn, light the torch with a _____, and adjust the oxygen valve.	a. striker b. match c. lighter d. strike plate torch

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USE OXYACETYLENE EQUIPMENT TO CUT METAL

Performance Checklist		
Step	Yes	No
1. Did trainee have on all his/her safety equipment?		
2. Did trainee establish a neutral flame on the torch?		
3. Did trainee get the correct tip size for the job?		
4. Did trainee control the torch while he/she was cutting?		

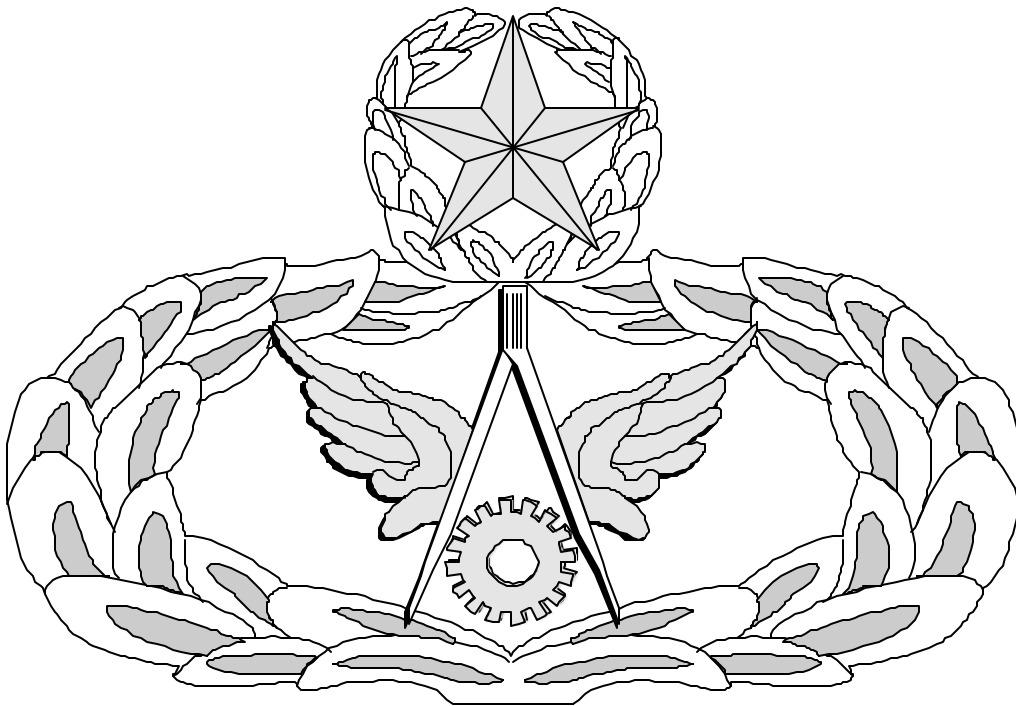
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Air Force Civil Engineer

QUALIFICATION TRAINING PACKAGE (QTP)

REVIEW ANSWER KEY



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MODULE 31

OXYACETYLENE WELDING

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ASSEMBLE AND TEST OXYACETYLENE EQUIPMENT FOR GAS LEAKS**(3E3X1-31.4.)**

Question	Answer
1. Welding equipment only needs to be checked for leaks once a month.	b. False
2. Acetylene hoses have right-handed threads.	b. False
3. Stand to one side of the cylinder when cracking the valve.	a. True
4. To test for leaks, open the _____ and acetylene valves with the needle valve on the torch closed.	a. oxygen
5. Acetylene bottles have _____ handed threads and oxygen bottles have _____ handed threads.	a. left, right

USE OXYACETYLENE EQUIPMENT TO CUT METAL**(3E3X1-31.10.)**

Question	Answer
1. How close should the flame be from the metal when cutting?	b. Inner cone slightly above the metal
2. What is the correct tip size to use to cut 3 inch metal?	c. 5
3. A shower of sparks falling from the opposite side of the metal will indicate that _____.	c. the cut has penetrated through the metal
4. The hand-cutting torch is similar to the welding torch, but is different in construction and method of control.	a. True
5. The cutting torch mixes oxygen and acetylene in definite proportions; burns the mixture in a preheating flame, which heats the work.	a. True
6. According to Table 1, if the plate thickness is 3 to 4 inches thick, use a size ____ tip, acetylene pressure of ____ and oxygen pressure of _____	a. 5, 4, 55 to 60
7. To get a neutral flame, turn the acetylene needle valve open 1/4 turn, light the torch with a _____, and adjust the oxygen valve.	a. striker

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